

IN THE SPECIFICATION:

Please amend the specification from page 10, line 13 to page 16, line 24 as follows:

In ~~Fig.~~ **Figure 1** a vehicle interior **1** is illustrated as a room with a communication installation **2** with four positions **P1** through **P4**, wherein each comprise at least one receiving point **4** and at least one sending point **6**. There can also be fewer or more positions **P1** through **P4** according to the size of the vehicle interior **1**. In vehicle interior **1** at least one microphone **M1** through **M4** is provided as a transmitter at each sending point **6**. For example a microphone array that comprises a plurality of microphones can also be used in place of the microphones **M1** through **M4**. Similarly at least one loudspeaker **L1** through **L4** is provided at each receiving point **4**. According to the type of embodiment several loudspeakers **L1** through **L4** can also be provided. Consequently each position **P1** through **P4** is denoted by a so-called loudspeaker-microphone system.

~~Fig.~~ **Figure 2** shows the four positions **P1** through **P4** with each of the associated loudspeaker **L1** through **L4** and with each of the associated microphones **M1** through **M4**. The positions **P1** and **P3** are occupied by persons, wherein the person in position **P3** is actively speaking and the person in position **P1** is listening. In operation of the communications installation **2** a transfer of the transmitted speech signal **S** occurs over at least one acoustical path **A1** through **A2**. That means that the signal **S** arrives at the person in position **P1** directly from the person in position **P3** by traveling over the acoustical path **A1**. Simultaneously the signal **S** from the microphone **M3** associated with position **P3** will be

output on loudspeaker **L1** of the position **P1**. The person in position **P1** hears, as a result, the sum of the direct sound from acoustical path **A1** and the indirect sound from acoustical path **A2** of the signal **S**.

In addition to the direct input of the signal **S**, microphone **M3** receives the indirect sound from loudspeaker **L1** over a feedback path **R1**. In addition, signal **S'** received via microphone **M1** will be output on loudspeaker **L3**, where it arrives at microphones **M1** and **M3** over further feedback paths **R2** and **R3**. Consequently several feedback couplings develop by the operation of the communications installation **2**, that can lead to an instability of the communications installation and that can especially lead to loud feedback whistles.

For the avoidance of such acoustical and/or electrical echoes as well as for the compensation of level losses of the signal **S** along the acoustical path **A1**, the communications installation comprises two electrical paths **E1** and **E2** for the signal **S**, as is shown in Fig. Figure 3. The electrical path **E1** runs between the microphone **M3** and the loudspeaker **L1** and comprise a level meter **W1** and an echo canceller **K1**. That means that the signal **S** picked up by microphone **M3** will be output on the loudspeaker **L1** over the electrical path **E1**. The echo canceller **K1** serves as the compensation for the acoustical and/or electrical echoes on loudspeaker **L1**. The echo canceller **K1** is thereby connected adaptively to level meter **W1**.

A summing element **8** is subsequently connected to the microphone **M3** which is fed with a signal ~~S_k~~ **S_k** from the echo canceller **K1**

with a sign inversion. The signal ~~S_k~~ S_k represents thereby the value of signal S that is fed back from loudspeaker L1 into microphone M3.

Additionally the electrical path E1 comprises an attenuation element 10 and a time delay element 12. The signal level is controlled via the attenuation element 10, e.g. amplified, in dependence upon the amount of the attenuation exhibited by signal S along the transmission path, in particular along the acoustical path A1 according to Fig. Figure 2. The delay time element 12, that is preferably in-particular tunable, serves to delay the signal S along the electrical path E1, whereby the delay is adjustable so that the signal S that is transferred along both the electrical path E1 and the acoustical path A1 simultaneously arrives arrive at the position P1. Directly prior to the loudspeaker of position P1, the time delayed and amplified/attenuated signal S will be branched off into the echo canceller K1.

Similarly to the electrical path E1, the electrical path E2 likewise comprises an additional level meter W2 that is connected in combination with another echo canceller K2 as well as another summing element ~~10~~ 8', another, in particular adjustable, attenuation element ~~10~~ 10' and another, in particular adjustable, time delay element ~~12~~ 12'.

In addition the communications installation 2 comprises a controller 14 that, for example, is centrally arranged in the interior of the vehicle. The controller 14 comprises a number of inputs E1 through En, through which the signal ~~S_k~~ S' of each

microphone **M1** through **M4** is routed. Further a number of outputs **Q₁ [[01]]** through **[[On]] Q_n** are provided that serve as the control for the level meter **W1** through **W2**.

Similarly to the communications installation **2** in Fig. Figure 2, the positions ~~position~~ **P1** and **P3** are occupied, whereby the person in position **P3** actively speaks and the person in position **P1** listens. By the transmission of signal **S** along the acoustical path **A1** according to Fig. Figure 2, the signal **S** will be affected by the loss and/or affect of the signal level through attenuation, disturbance signals, such as road or wind noise and will be leveled out and compensated via the communications installation **2** as described below:

The active microphone **M3** is determined by the controller **14** as being the microphone with the highest signal level. The loudspeaker **L3** arranged near to the active microphone **M3** is deactivated through the associated level meter **W2** via the associated output signal on output **Q₂ [[02]]** of the controller **14**, so that feedback from the loudspeaker **L3** into the microphone **M3** is certainly avoided. Alternatively the signal level is correspondingly heavily attenuated via the associated attenuation element 10' device 10, so that a feedback from loudspeaker **L3** into the microphone **M1** and/or **M3** is likely not to occur.

In order to reinforce the signal **S** on the acoustical path **A1** on loudspeaker **L1** according to Fig. Figure 2 the signal **S** on the electrical path **E1** will be directly transferred to the loudspeaker **L1** via the actively switched signal level **W1**. The signal level along the electrical path **E1** will thereby be driven

in dependence upon at least one of the parameters of the associated transmission function. For the equalization of the level losses a parameter will be ascertained, that represents the attenuation of the signal **S** between position **P1** and the position **P3**. Preferably the attenuation of the signal **S** along the acoustical path **A1** between the position **P3** and the position **P1** will be determined with the aid of a desired level. The signal level will be amplified corresponding to the desired level via the attenuation element **10**. In other words, the loss in signal **S** along the acoustical path **A1** will be compensated for by the controlled attenuation element **10** in electrical path **E1**. The desired level of attenuation of signal **S** along the acoustical path **A1** in a standard automobile is, for example, approximately 12 dB. According to the type and design of the communications installation **2**, the signal level can be so controlled by means of a default or a variably adjustable desired level for the affected transmission path via the attenuation element **10**, that the desired level is reached. For example, upon exceeding a maximum value (i.e. maximum available attenuation) or by undershooting a minimum value (i.e. overlaying of several sound components) the signal level will, respectively, be proportionately amplified or attenuated.

Therein the acoustical (i.e. natural sound) and the electrical (i.e. amplified sound) sound components of the signal **S** arrive simultaneously at loudspeaker **L1**, the amplified signal in the electrical path **E1** is delayed via the delay element **12**. The time delay of the delay element **12** is thereby so chosen as to represent the propagation time of the signal along the acoustical path **A1**. Consequently there comes an addition of the two sound

components - electrical and acoustical - at loudspeaker **L1**. The amplified and time delayed signal **S** will be fed directly from the loudspeaker **L1** to the echo canceller **E1**. The echo canceller **E1** comprises a digital filter, particularly an FIR-filter, for the compensation of the acoustical and/or electrical echoes. The signal **Sk** of the echo canceller **E1** will be fed into the summing element **8** with a sign inversion for the cancellation of the acoustical and or electrical echoes in the signal **S**. In addition, the echo canceller can insert another delay element, which is not illustrated, with a propagation time equaling that of the feedback path **R1** or **R2** from loudspeaker **L1** and **L3** to microphone **M3** and **M1**, respectively.

For an especially simple and fast compensation of the losses of signal **S**, each of the parameters that describe the associated transmission path, for example the attenuation and the propagation time, are inserted into an attenuation matrix according to Table 1 in Fig. Figure 4. Therein the columns and the rows correspond to each of the positions **P1** through **P4**, wherein the position **P1** through **P4** in the case of the columns are the actively speaking persons and in case of the rows are the actively listening persons. Some of the matrix elements characterize the desired level of the attenuation for the given transmission path. The others represent the propagation time and/or delay time associated with the given transmission path. The stated values are exemplary of the different transmission paths that have been observed in a standard automobile. Thereby the measured values are measured based upon the transmission function of signal **S** from approximately 300 Hz to approximately 2 kHz. It becomes clear, that near the position **P1** through **P4** the

persons and their roll - speaker or listener - determines the derogation of the signal propagation. For example there is a loss of about 16 dB if the person in position **P1** speaks and the person behind him in position **P3** listens. When the positions **P1** and **P3** interchange the roll as speaker and listener, a loss of about 13 dB results. The attenuation element **10** as well as delay element **12** is adjusted depending upon the values stored in the attenuation matrix corresponding to the given transmission path. Consequently the required amplification of the signal level for the acoustical path **A1** or **A2** is determined especially simply and quickly, whereby the need for an especially complex or costly signal processor is avoided.

In the attenuation matrix according to Table 1, the acoustical transmission path between each laterally adjacent positions **P1** - **P2** and **P3** - **P4**, respectively, will not be reinforced. The transmission function will be treated as adequately good for communications. Depending upon the size of the room 1, the number of positions **P1** through **P4**, the number of microphones **M1** through **M4** as well as the loudspeaker **L1** through **L4** may vary, and accordingly, the number of possible transmission paths and matrix elements of the attenuation matrix may vary. Besides this, further parameters of the transmission function can be included in the attenuation matrix such as, for example, signal type, disturbance signal.